WHAT IS CLAIMED IS:

1. An exhaust manifold cooling jacket comprising a housing to be attached to a cylinder head of a combustion engine, the housing defining

a cavity sized to enclose an exhaust manifold of the engine and form an insulating space between the exhaust manifold and housing, as attached to the cylinder head,

a coolant passage therein for receiving liquid coolant from an inlet of the jacket and for flowing the coolant through the cooling jacket, and

an exhaust passage extending between an inner manifold interface surface of the housing and an exhaust elbow interface surface of the housing, for forming a sealed exhaust conduit for conducting a flow of exhaust from the exhaust manifold through the housing.

2. The exhaust manifold cooling jacket of claim 1, wherein the cooling jacket housing is in the form of a shell having an open side sufficiently large to permit the housing to be placed about the exhaust manifold of the engine with the exhaust manifold mounted upon the cylinder head.

3. The exhaust manifold cooling jacket of claim 2, wherein the open side of the housing comprises a rim extending about the open side and lying in a single plane to form a planar block interface surface.

4. The exhaust manifold cooling jacket of claim 3, wherein the rim of the housing is arranged to be coplanar with a block interface surface of the exhaust manifold, as attached to the cylinder head, for engaging a backing plate mounted between the cylinder head and exhaust manifold and extending laterally beyond the exhaust manifold.

5. The exhaust manifold cooling jacket of claim 1, wherein the cooling jacket housing is sized and constructed to directly contact the exhaust manifold only at the inner manifold interface surface.

6. The exhaust manifold cooling jacket of claim 1, wherein the coolant passage comprises a single enclosed, cup-shaped cavity extending across one broad face of the housing and into multiple sides of the housing.

7. The exhaust manifold cooling jacket of claim 1, wherein the housing further defines a coolant outlet extending from the coolant passage through the exhaust elbow interface surface adjacent the exhaust conduit.

8. The exhaust manifold cooling jacket of claim 1, wherein the housing is in the form of a unitary casting.

9. The exhaust manifold cooling jacket of claim 1, wherein the housing further defines at least one mounting hole extending through the housing adjacent the exhaust passage and arranged to align with a mounting hole on the exhaust manifold, for receiving a threaded fastener to attach the housing to the cylinder head via the exhaust manifold.

10. The exhaust manifold cooling jacket of claim 9, wherein the mounting hole of the housing is further arranged to align with a corresponding mounting hole on an exhaust elbow placed against the exhaust elbow interface surface to receive exhaust flow from the exhaust conduit, for simultaneously attaching both the housing and the exhaust elbow to the exhaust manifold.

11. The exhaust manifold cooling jacket of claim 1, wherein the cooling jacket is constructed to isolate the liquid coolant from any direct contact with the exhaust manifold.

12. The exhaust manifold cooling jacket of claim 1, wherein said insulating space is filled with air and isolated from the flow of exhaust.

13. The exhaust manifold cooling jacket of claim 1, wherein said insulating space is filled with a conductively insulating material.

14. A method of altering a combustion engine to enhance exhaust gas cooling for use in a marine environment, the method comprising the step of placing a cooling jacket directly between an upstream exhaust manifold secured to a cylinder head of the engine, and a downstream exhaust elbow of the engine, the cooling jacket comprising a housing defining a cavity sized to enclose an exhaust manifold of the engine and form an insulating space between the exhaust manifold and housing, as attached to the cylinder head,

a coolant passage therein for receiving liquid coolant from an inlet of the jacket and for flowing the coolant through the cooling jacket, and

an exhaust passage extending between an inner manifold interface surface of the housing and an exhaust elbow interface surface of the housing, for forming a sealed exhaust conduit from the exhaust manifold through the housing.

15. The method of claim 14 further comprising the step of placing a backing plate between the exhaust manifold and the cylinder head, the backing plate defining sealed passages therethrough for conducting exhaust gasses from the cylinder head to the exhaust manifold, the backing plate extending laterally beyond the exhaust manifold to engage the cooling jacket housing to inhibit air flow through the insulating space between the cooling jacket housing and the exhaust manifold.

16. The method of claim 14 further comprising the step of providing the exhaust elbow with a coolant passage with an inlet for receiving the coolant from the cooling jacket housing and for injecting the coolant into a flow of exhaust received from the exhaust manifold through the cooling jacket housing.

17. The method of claim 14 comprising simultaneously mounting the exhaust elbow and cooling jacket housing to the exhaust manifold by inserting at least one fastener through aligned mounting holes in the exhaust elbow and cooling jacket housing and securing the fastener to the exhaust manifold.

18. An exhaust manifold cooling jacket, comprising

a housing forming a cavity sized to enclose an exhaust manifold of a combustion engine with a gap therebetween, the housing defining a coolant inlet and a passage therethrough for the flowing of liquid coolant through the cooling jacket.